

## WHAT IS CLAIMED IS:

- 1           1. A nucleic acid sequence including at least one  
2 cloning site and selected from the group consisting of:
  - 3           (a) a nucleic acid sequence according to Seq ID No. 1  
4 or its complementary strand,
  - 5           (b) a nucleic acid sequence that hybridizes under  
6 stringent conditions to the nucleic acid sequence as defined in  
7 (a), and
  - 8           (c) a fragment comprising at least about 200  
9 consecutive base pairs of the nucleic acid sequence as defined in  
10 (a) or in (b).
- 1           2. A vector for insertion of a heterologous sequence  
2 into the ATI region of an orthopoxviral genome, said vector  
3 including a nucleic acid sequence selected from the group  
4 consisting of:
  - 5           (a) a nucleic acid sequence according to Seq ID No. 1  
6 or its complementary strand,
  - 7           (b) a nucleic acid sequence that hybridizes under  
8 stringent conditions to the nucleic acid sequence as defined in  
9 (a), and
  - 10           (c) a fragment comprising at least about 200  
11 consecutive base pairs of the nucleic acid sequence as defined in  
12 (a) or in (b).

1           3. The vector according to claim 2 wherein the nucleic  
2 acid sequence includes at least one cloning site.

1           4. The vector defined in claim 3 wherein additionally  
2 at least one transcriptional control element is included in the  
3 cloning site of said nucleic acid sequence.

1           5. The vector defined in claim 3 wherein the cloning  
2 site is the restriction site EcoRI.

1           6. The vector defined in claim 4 wherein the at least  
2 one transcriptional control element is obtained from a poxvirus  
3 genome or is a consensus sequence from a poxvirus genome.

1           7. The vector defined in claim 2 further comprising at  
2 least one heterologous sequence, said heterologous sequence  
3 functionally associated with a transcriptional control element  
4 thereof.

1           8. The vector defined in claim 7 wherein the  
2 heterologous sequence is selected from the group consisting of  
3 marker genes, therapeutic genes, host range genes and genes  
4 encoding immunogenic epitopes.

1           9. The vector defined in claim 7 comprising a  
2 recombinogenic sequence, which flanks one or more heterologous  
3 sequences encoding marker genes, host range genes, and or a  
4 transcriptional element thereof.

1           10. A recombinant orthopoxvirus having an ATI gene,  
2 comprising in its ATI gene region the nucleic acid sequence  
defined in claim 1 and an inserted heterologous sequence .

1           11. The recombinant orthopoxvirus defined in claim 10  
2 wherein the orthopoxvirus is selected from the group consisting  
3 of a modified vaccinia Ankara virus, vaccinia virus Western  
4 Reserve, and vaccinia virus Copenhagen.

1           12. The recombinant orthopoxvirus defined in claim 11  
2 wherein the orthopoxvirus is the modified vaccinia Ankara virus.

1           13. A method of introducing a heterologous sequence  
2 into the ATI gene region of an orthopoxvirus having an ATI gene  
3 to obtain a recombinant orthopoxvirus which comprises the steps  
4 of:

5           (a) transducing a host cell with a vector as defined in  
6 claim 2 comprising at least one heterologous sequence;

7           (b) infecting said host cell with an orthopoxvirus  
8 having an ATI gene;

9 (c) inserting the heterologous sequence into an  
10 insertion site of the ATI gene of the orthopoxvirus by homologous  
11 recombination between the nucleic acid sequence and a  
12 corresponding genomic sequence of the orthopoxvirus to obtain a  
13 recombinant orthopoxvirus; and

14 (d) isolating said recombinant orthopoxvirus.

1 14. The method of introducing a heterologous sequence  
2 into the gene region of the orthopoxvirus having an ATI gene  
3 defined in claim 13 wherein according to step (b) the  
4 orthopoxvirus is modified vaccinia Ankara virus.

1 15. A target cell comprising the recombinant  
2 orthopoxvirus having an ATI gene defined in claim 10.

1 16. A target cell comprising the vector defined in  
2 claim 2.

1 17. A pharmaceutical composition for effecting an  
2 immune response against an infectious disease or a proliferative  
3 disorder which consists essentially of a therapeutically  
4 effective amount of the recombinant poxvirus as defined in claim  
5 10 and in a form capable of producing an immune response against  
6 an infectious disease or a proliferative disorder in combination  
7 with a pharmaceutically acceptable inert carrier or diluent.

1           18. A method of effecting an immune response against  
2    an infectious disease or a proliferative disorder in an animal  
3    subject which comprises the step of administering to said subject  
4    a therapeutically effective amount of the pharmaceutical  
5    composition defined in claim 17.